From NEURONS TO NEIGHBORHOODS
New Ways to Prevent and Heal Emotional-Trauma in Children and Adults

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CLINICAL WORK WITH ABUSED AND NEGLECTED CHILDREN - 1

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From the 2003, from Neurons to Neighborhoods Conference, this is tape number 6, part 1 of a workshop with Dr. Bruce Perry on Clinical Work with Abused and Neglected Children and Their Families.

You saw a slide of this boy's brain when he was three. He was the boy who was raised in the cage. Remember the first slide comparison between the healthy brain and the brain following neglect? That actually was taken when this boy was three years old, and he was seen at a tertiary care pediatric hospital that fancies itself one of the best hospitals in the world. The circumstances of the child coming in were that the elderly gentleman who was taking care of this boy was concerned that the child was not "normal." He brought the child in to be seen.

He was seen in the developmental pediatric clinic. The developmental pediatricians, not knowing very much about brain development, unfortunately, which is a weird irony that it's in fact the case. It's amazing how little of that information actually goes into the curriculum for training for developmental pediatrics. They saw this boy who was very, very unable to ambulate normally. He sort of crawled around and walked almost dog-like. He grunted. He had no speech or language capabilities. He was very primitive and delayed in his behavior. They declared him as having static encephalopathy, which is those of you who don't know what that means, is a fancy way of saying your brain's broken and it won't change.

The doctors believed that the brain was unchangeable, and rather than doing something, like ordering occupational, speech, language, physical therapy or things that could actually help the child, they told this gentleman to take the child back, there's nothing you can do and good luck, we'll see you in a year. He came in three more times until he was six years old.

This elderly gentleman brought him in because he had pneumonia. He had really, really bad pneumonia, so they put him in a pediatric unit. The child acted out tremendously. He was just combative and sort of crazed. They labeled him, of course, with aggressive, inappropriate, and violent behavior. This kid was basically scared to death. They put him into the ICU where the observational ratio was a little bit higher and they put him in an iron crib. And, because he was trying to crawl out of it and do other things, they took a piece of plywood and wired it over the top of it. The boy is in a fancy tertiary care

hospital essentially in an iron cage. When you hear what really happened to this child, you'll be even more horrified.

The boy was so confused and out of control. The only thing that he could do was bite, scream, yell, and throw. So, he started throwing poop. What else did he have to throw? They took everything away, so he'd poop and then throw the poop. Knowing that I have significant expertise in this, I'm known far and wide for my expertise in dealing with poop-flingers, they consulted me to come and see this child. That's when we got involved. Let me just tell you what we saw. Clinically, we saw that this child was terrified. Any of you who have been in an ICU know this incredible sensory overload. There are noises going off, beepers, flashes and people in and out. It's just crazy. It was terrifying for this child, who, as it turns out, had come from a very sensory depriving environment. This was sensory overload. He didn't know where he was, he didn't know why he was there. He just knew he felt sick and was confused and out of control. He was a mess.

I went and I got a history from the elderly gentleman. You are not going to believe this, but this, honest to God, happened. This child's mother was young when she had him. She didn't have any substance abuse problems that he knew of, but she was sort of wild. She got pregnant when she was young and gave the child to her mother who was sort of elderly, very, very overweight woman, nurturing, and a very nice woman. But she couldn't get around very well because she was so big.

For the first year of this child's life, he's taken care of by this grandmother, who happens to be living with this gentleman. They're not married. The mother just disappears from this child's life. They live in a somewhat rural area in Texas. The elderly gentleman is very nice, a very good-hearted man, but he just never has had kids, doesn't know about kids, he raises dogs. The first year of this child's life he got probably lots of nurturing. Then when he started to walk around and move a little bit, the mother couldn't, so the grandmother couldn't deal with him. They didn't have a crib and they didn't have a playpen thing so they put him in one of these dog cages. This woman, being very, very overweight, was physically not well, and she died when he was about 14 months old.

This gentleman, who is not legally the guardian, goes to Child Protective Services, the local social services and says, "Hey, I need help with this boy." The CPS system in Texas, like everywhere else, is overburdened and they go, "Well, you've been taking care of this kid, go on, go ahead." They just basically lost the file of this kid, and he was with this elderly gentleman who just didn't know what to do with him and kept him in this iron cage. Kept him in a dog cage and raised him with his dogs.

I got this history in ten minutes. I'm thinking this is not good. I went in and sort of quieted down this little boy. I basically let him throw poop at me for a little while. The nursing staff is, of course, watching this like wow, is that how you get rid of poop-flinging behavior? I say, "Well somebody's got to get close enough." He flung poop at me and he would do all of this outrageous stuff and I just sort of stayed quiet, stayed close, came and sat next to him. I would bring a chair and sit next to the crib and sit there and

sit there. Every once in a while he would come over and poke at me and pretty soon he was putting his hand on me. Then when I wasn't around he would get all agitated, so I had other people on my team come and we'd sit. He got to know a few of us, and pretty soon he was interacting with us in these primitive ways.

Then we said, "Gee we think he needs OTPT and this and that. The developmental pediatricians who were the attendings on this case, refused. You know why? Because they had no money and it would have to come out of the hospital or the developmental pediatricians fund. Keeping in the theme, I threw a shit fit. Fortunately we had significant resources and we were able to pay for these services. Pretty soon this little boy was feeding himself and he was starting to walk a little bit. I mean we're talking within a month. Then he got better and we told his old guy, we said, "Listen, you're a nice guy and great, but you know what, that's not the way you raise kids, do you mind if we actually have somebody who knows how to raise kids take care of him?" He said, "Great, I've been asking for help."

In this non-punitive way, we got him hooked up with this wonderful, wonderful foster mother, who is this big, old, loving woman. I put him specifically with this foster mother because I knew that she was a wonderful lady. No matter what happens, no matter what she was told by experts, she never did it. She would come into the clinic with these other kids and she'd come in and pinch my cheek and give me this hug. She'd listen politely to our recommendations and she'd go, "No, I don't think that's what this child needs and thank you very much," and off she's go. She was usually right. We knew that she would take this child and ignore his chronological age. She would look at him the way he came to her, his developmental age. A year later I open up the mail and I get this picture of this little boy. I can't even recognize him. Standing in nice school clothes with his lunchbox, ready to go to his first day of school. He's now walking and talking and he wrote this little note. "Thank you." Here's this kid who would have been warehoused, because they didn't understand brain development. The experts in the medical system didn't understand the brain.

Understanding the brain is important for clinical work. This is an interesting case. This cost the public dollars. I'd say this cost you and I, as taxpayers, about $500,000, this little escapade of not knowing anything about the brain. Here's the situation. Madrid, Spain. The embassy gets a call from a 16-year-old boy, who says, "I am so and so from San Antonio. I've escaped from my abductors. I was kidnapped when I was age seven and they brought me over to Spain in a military transport and sold me into prostitution. I've been working in these underground brothels as a child prostitute for the last ten years. I finally escaped, and I need your help." The embassy is like, "Oh my God." They sent security officers down. They got this kid. They brought him back to the embassy. The FBI sends a couple of agents over to Madrid. They start doing an investigation. They bring the child back to his family who basically have been longing for this child and given up and are so happy to see him. His friends, his family, all these people greet him and everything is hunky dory.

The FBI, of course, wants to find out what happened, because this is a bad thing, kidnapping kids and selling that into prostitution. They think it might be the United States military, because the only way to get into Europe without a passport is if you come in on a military transport. So they thought, San Antonio has three Air Force bases, they think maybe this is it. They're very serious about this investigation. They've got a big team on it. I work with the FBI on occasion, interviewing kids, and so they asked me to interview this child, because they didn't want to traumatize him. This is amazing that they did this.

I come in and I meet this child. I speak to him for a minute, just to greet him, because I usually do this before I do a clinical interview. I'll meet the child, I'll make them look me in the face, I'll have a very brief interaction, I'll tell them exactly what's going to happen. I let them know that they have control of this. They don't have to tell me anything, you know. They just take some time and think about whether or not they want to spend some time talking with me about his/her experience.

I went back in and talked to the agents and I said, "This guy's a fraud. It's impossible. This cannot be the boy." And they're like, "What are you talking about? We had our facial analysis people do our… He's got a 90 percent point to point thing from…you know how they age young children? He's got a tattoo that's exactly the same place as this kid. This seven-year-old kid had a tattoo. I don't know why, but he had a tattoo. Anyway, I said, "Listen, correct me if I'm wrong, was this child raised in San Antonio?" "Yes." "What's the parents native language? Is it English or is it French?" They said, "What are you talking about?" I said, "Well, this kid cannot speak English without a French accent." They said, "Well he spent all those years in prostitution maybe these people were French." I said, "No. If you understand how the brain works, if you'd gone to my lectures up at Quantico, you would know." They thought I was crazy, they were all enraged at me.

The family was really upset. This is a big, high profile press thing. Finally they got a judge to force him to give a DNA sample and it turns out, lo and behold, this is a 28-year-old fugitive who is wanted by Interpol by three countries in Europe for fraud and child abuse.

Five minutes of an interview should have told them, because they understand how the brain works. During the laying down of these templates in your brain, about speech and language, all human languages are comprised of some of the 40 sounds that humans can make—phonemes. In the first years of life, most languages really are only 38 or 37 of these phonemes. Let's take Japanese, for example. The Japanese language doesn't make a distinction between the sounds "r" and "l". So if you get to be age seven, and you've only heard Japanese and then you learn English, you cannot say Bruce Perry, you say Bluce Pei. My chairman in pharmacology at Northwestern, who is a great guy and a wonderful man, Toshia(?) Norihashi, he discovered why local anesthetics work. He learned English after he was older, and he called me Bluce. He'd send me notes, B-l-u-c-e. As a joke. We'd go back and forth on this.

This kid when he greets me in the waiting room, he cannot speak English without using phonemes that are common to French and not in the English language. This is another interesting situation I could go on and on. I don't want to do too much about this. This one's too ugly and too gross. I don't want to talk about that.

This is an interesting situation. A 16-year-old girl was brought into the emergency room completely catatonic. Her heart was very, very, very slow. Her heart rate was so slow that it stopped at one point and they had to bring out the paddles and cardiovert(?) and restart her heart. It looked physiologically like she'd had an opiate overdose, like she'd taken too much morphine or heroin or something. But the toxic screens were negative. They didn't know what was going on. I was actually down in the emergency room for another reason and they said, "Would you please talk to the mom? Just calm her down." Because having a 16-year-old kid in the E.R. where you have to run a code on her, is a pretty overwhelming thing. I learn a little bit about what's going on with this child, and then I go talk to the mom.

I always take a developmental history, even if it seems completely irrelevant. And, I can do it pretty quickly. Here's what I found out. This child was the product of a marriage that broke up when she was about three. The mom remarried when the child was about five. Turns out, unfortunately, from age five to about age nine, this man who the mother had connected with was a pedophile and he was sexually abusing this girl during that time. Then the mother found out and kicked him out and that was over.

This week, right before she was found collapsed in the bathroom at her school in this unconscious state, the day before or the night before, they got a call from this gentleman who said, "I'm going to be in town and I'm going to come by and see you." She goes to school and they see her there unconscious. I know how the brain works, I think that this is an extreme dissociative response. I go to the pediatric folks, fortunately they know me and they've seen me do this stuff before, otherwise they would have kicked me out of there. I said, "Let's give her some Noaxon(?). They said, "Well she didn't have an opiate overdose." I said, "Well just try it. Let's see what happens." Noaxon(?) is an opiate antagonist. It blocks the ability of your endogenous opioids that we all make to work at their receptors.

It turns out that one of the most common responses to inescapable threat is to dissociate. For a young child who has been serially sexually abused, they will tend to develop what we call a sensitized dissociative response, which means that when they're reexposed to cues associated with that event, they will release opioides and have this physiological response. They give her some Noaxon(?), two minutes later she sat up and she said, "What am I doing here?" We were able to help her and then help her deal with some of that stuff, because we understood how the brain develops and how it changes.

Here's an interesting and relatively sad situation with a young child. A three-year-old who was basically from a somewhat chaotic environment and because of that he was pretty much pre-verbal even though he was three. He wasn't very verbal at all. He

witnessed his sister have her head smashed in with a frying pan. It had to be one of two people. Both of them denied it, and sort of tried to allege that the other person did it. This boy witnessed it. I sat down with this boy, and I did an interview without words basically, no questions, and I was able to find out who did it. I'll show you why when I talk about the stress response. The bottom line is, however, that memory is stored in many ways. I didn't have to use cognitive memory. I didn't have to use his ability to give me a verbal narration. I was able to use his physiological response that was stored during the traumatic event.

The brain is a remarkable organ. Has sensible organization. Organizes from the bottom to the top. You know that there's the sequential acquisition of skills and capabilities during development, and there's the sequential development of neural systems during development that is responsible for that sequential acquisition of function. In order for us to understand how the brain works and how the brain changes, you have to understand something about memory. I'm going to talk about memory probably in a way that's a little different from the way most of you have thought about memory in the past. I do not mean by memory only the ability to recall names, faces and phone numbers. That is one way in which memory manifests. There are other ways.

When I talk about memory, what I'm talking about is this remarkable property of biological tissue to carry forward in time some reflection of an experience. For example, when you get an immunization and you're a little child, by virtue of an experience, an exposure to a substance, your immune system, your white cells, will go through a change. They'll carry that change forward in time so that later on when they're re-exposed to a very similar signal, they will have a certain reaction. That's a form of memory.

There are no other biological tissues in your body that are specifically designed to store memory than neurons. Your brain literally is designed to continually change in response to experience. The principle that guides most of this change is, as I've said earlier this morning, activity-dependence. Use-dependent activation of neural systems leads to microscopic, microarchitectural changes in neurons and their networks that lead to functional changes. I've said this, but neurons have this remarkable capacity to be continuously in dynamic activity. Your brain right now is different than it was this morning. The neural systems that you use for recalling your phone number right now, if I asked you to recall your phone number right now, you would use different neurons today than you used three weeks ago. Some of them might be the same, but they will have been modified, because your brain is always changing. This is a very important thing for therapy.

Those of us who are interested in therapeutic interactions need to remember that therapy is the creation of new memory. It's not going back and undoing. It is creating new things. This is a drawing of a neuron. I emphasize drawing, because, believe it or not, there are people who think that some of the earlier pictures that I showed were actually neural imaging.

I'm at the APA meeting, the American Psychiatric Association, in New York City a number of years ago giving a presentation about the brain. I did not show any actual images of the brain, I didn't show any of our FMR, MRI stuff. I didn't show any PET scans. Afterwards, a gentleman came up who was a physician, a psychiatrist no less, and said to me, "You know what? Those images are amazing." I said, "I'm sorry?" He said, "The new techniques allowing you to show those images of the brain are just remarkable." I said, "Oh." I said, "What images?" "You know, the ones where the cortex is blue. I never knew." I swear to God this story is true.

This is a cartoon, okay? This is not some fancy neural imaging technique that has allowed me to isolate one neuron and show you. I want you to appreciate to a tiny degree, and I know you already all do mostly, but I want to remind you that neurons have this remarkable capacity to get lots of signals through these dendritic nets. These signals get integrated and turned into a unified signal that comes down here and results in the release of neural transmitter at the synapse, which then stimulates the dendrites on other neurons. Then you get this remarkable chain of activity. The reason I'm emphasizing this a little bit is that I want you to appreciate that there are certain kinds of experiences that are going to lead to patterned neuronal activity, and there are certain kinds of experiences that are going to lead to sort of dissynchronous neural activity. Patterned repetitious consistent experience leads to patterned repetition in neural systems, which leads to memory, which leads to change. The more there's this patterned, repetitive neural activity, the more there will be changes in the neural network. If the signals are chaotic, unpredictable, dissynchronous, you don't get the same kinds of changes in neural systems. In a very interesting way, what happens is because of this, external consistency, external predictability, external patterns lead to organization in the brain. External chaos leads to chaotic dissynchronous organization in the brain.

Many of the things that are taking place in the brain are driven and shaped by external patterns of information. Our senses, eyes, nose, skin, and motor translate all of this stuff out here into patterned neural activity. When you think about it, your brain is continually being bombarded by signals, continually, from both your inside environment and your external environment. What's very, very important is that your brain is managing all of this information in a way that requires that you compare the incoming pattern of information with previously stored patterns of information. Remember how I talked about this internal template that you create during attachment? That's what I'm talking about. All incoming information in a given domain is compared against previously stored information in that domain. Now this is important for several reasons.

The first reason it's very important is that the brain could not conceivably store every single aspect of every single experience. Right? It's impossible. We don't have enough hard drive space. What the brain does is it creates original memories. Let's take an example. Here you are in utero. Intrauterine environment. Your brain in the second and third trimester has the sensory apparatus to perceive body temperature, sound, taste and scent. All kinds of tastes, senses, sounds and movements are being translated by the little fetus into patterned neuronal activity in the brain. That becomes a set of familiar

patterned activity. Your brain is creating essentially a set of memories associated with the intrauterine environment. Because the brain has this remarkable capacity to associate things that co-occur in time, your brain begins to associate the sensory environment of the intrauterine world with being safe, being not hungry, being not cold, being not overwhelmed. It's literally a time in your life when you are sort of most at, if you will, rest. You're most quiet. You're never hungry, you don't see colors, you don't see anything. You are embraced. You don't get the motor vestibular signals associated with moving your arm around. You don't get the signals associated with visual input. You don't get the signals associated with sharp auditory cues. But you have this continuous background beat from your maternal heart rate.

All of a sudden you go from that sensory environment to an environment that is absolutely sensory overload. You're born. The process of being born is a very stressful experience. Now stress is not bad. I don't want you to equate stress equals bad. Stress actually does not equal bad. In fact, most of the time stress equals good. We'll talk about that a little bit later on. The brain has the job of keeping you alive, right? Remember I said that's one of the core functions of the brain? Any time the brain sees neural signals or patterns of neural activity that are new or unfamiliar, it activates the alarm system and it says well this could be bad. I need to interpret this and figure out what this is, make sense of this. Until I do, I'm going to get my alarm systems on. Your body, whenever there's any new information, any novel information, will activate your arousal system.

Here's the child just born, completely new motor signals. The child has never been cold before, all of a sudden going from the body temperature of 98 degrees to a body temperature of 72 degrees, or sensation of 72 degrees on the outside. What is this? The background beat is gone. The whole set of familiar stuff is gone. What happens? When people feel sense of threat, they get part way up this arousal continuum, they actually act on that to try and promote survival.

What do infants do? They can't act very much. They cry out. When they cry, what do we do? We recreate sensory environmental cues that are safe and familiar. We swaddle them up, we put them in our arms, we try to warm them up, we rock them, we turn the lights down, we talk in more hushed voices, more prolonged so it approximates the way the voice sounds in the intrauterine environment, and babies quiet down.

Now the frequency that we rock at is very interesting. What frequency do we rock? About 80 beats per minute. Every culture does this. If your mom has hyperthyroidism and arresting heart rate is 100, what frequency do you have to rock to make the child feel comfortable? About 100. If the mother had all kinds of stress and de-stress during pregnancy and she's overwhelmed, and her heart rate goes high sometimes and low sometimes and it's all over the place because there's inconsistency and unpredictability, is there a frequency at which you can rock that will calm the baby? Not usually. What happens is these kids have a higher probability of being what we call difficult to soothe.

In utero, the brainstem is organizing. And the brainstem and all the patterned neuronal activity in the brainstem is entrained and driven by primarily maternal heart rate. If this is all synchronous and chaotic because the mother's had external chaos and her internal physiology is all over the place, the brainstem is basically poorly organized and these kids have what we call state regulation problems. Thus, they're harder to soothe and they're harder to calm. Then the combination of that with an inexperienced caregiver leads to more problems. But we'll get to that.

We're talking about laying down template memories. The child has a set of experiences, has a set of neural patterns that are familiar from the intrauterine environment. Then, and I talked about this a lot, the child is beginning to build in a connection between the neural patterns of activity associated with this caregiver, being calm and soothed and they're beginning to acquire new memory. They're beginning to lay down new memory. They're beginning to change the brain. One thing that happens over time is that the sequential acquisition of memory takes place little by little with the introduction of new experiences that are motor, social and cognitive. I will come back and talk about it in a few moments, this process of changing the brain and influencing how the brain develops, and the basis for normal development, education, therapeutic interactions, etc., etc.

We lay down these template memories. We've gotten to the point where we're born, we have started to make an association between this caregiver and really good things. Two days after you're born, all of a sudden you have a poop, and you have this weird feeling in your…you know, then it goes away. Then all of a sudden you hear all this oohing and awing and these humanoid things come and hover over you smiling. You're like what's going on here? All of a sudden your heels are up by your ear. You go, "Whoa, I've never been in this position before." Then the cold wipie comes and sweeps up your rump. You know what happens? This is all brand new information, brand new neural patterns of activity, the parents are thinking, "Oh what a wonderful little event, our first poop," Meanwhile, the baby is thinking, "This sucks." It's alarm, it's stressful. You release cortisal. You have a tremendous response to this, because it's brand new. It's novel. You've been pushed way out of your comfort zone. You've never been like that before.

Well, now what happens is your brain is judging all this new information that's potentially threatening until proven otherwise. Here's the first trial. The first trial is this person who has these humanoid features that you're beginning to like. You haven't had enough trials to completely make that bond yet, but it's starting. Two days later you've had twice as many opportunities to connect with this person and you think they're pretty good. Then you have the second poop. Then that set of neural signals is familiar, but it's still not completely familiar. But, you don't get as stressed. It doesn't induce as much of an alarm response. The third time and the fourth time and the fifth time, and pretty soon, because you've had this introduction to a new pattern of neural activity in the presence of a loving caregiver who you perceive as safe, you ultimately get to the point where you can associate this new pattern of activity with positive things. Something that was one overwhelming and stress inducing, ultimately became less stress inducing, then familiar,

then neutral, and then positive. This is the process of development. This is what I want you to recognize.

The first time a child is introduced to something new, you're causing a whole bunch of physiological responses that are actually stress-inducing. This stress response is activated. If your stress response isn't activated, you're not going to learn anything new. If you don't leave your comfort zone, you're not going to learn anything new. The process of development requires the gradual sequential introduction of new neural patterns of activity, which once the brain is exposed to them, your brain has made a template set of activities. It's made associations between having your diaper changed and a healthy caregiver so that later on, I don't want to get too analytic here, in life when people are manipulating you down there, it's associated with intimacy and positive things and not necessarily with fear and terror.

I've worked with kids who I know are going to have problems with sexuality their whole lives. You know why? Because when their diapers were changed, their pedophilic parents just thought a little while to insert a finger. Thought for a little while and after a while they started inserting genitals. The whole process of that tactile sensation down there, instead of being associated with loving, intimate caring interactions, it becomes associated with fear and pain and assault. These template experiences shape your brain in very meaningful and important ways.

Let me give you an example, a further example. I'm going on and on and on about this, because these templates are so important because we lay them all down early in life. You are not sitting on your rumps. I use this example all the time. I apologize to those of you who have heard me speak. You're sitting on your butt and you're getting neuronal signals from your motor vestibular system telling you that you're looking forward and that you are in a certain position in space. You're getting tactile information and it's all going up into your brain. What's happening in your brain is that it's getting matched against previously stored rump-sitting experiences. Your brain is saying, "I've been there, done that, I'm familiar with this. There's no reason for me to activate an alarm response, and there's no reason for me to make any new memory."

This is the important thing. You cannot conceivably store every single aspect of every single experience. So once you've laid down these templates, you basically shortcut all the rest of your experiences, because they, kind of, match that. You don't make any new rump-sitting memory. You're not going to walk out of today having any change in this part of your brain. None of you are going to have any new motor vestibular experiences. None of you are going to have any state experiences. None of you, I hope, are having huge physiological reactions to this presentation. None of you are going to have significant emotional responses. What's going to happen is you're going to take a tiny little fragment of your cognitive memory and you're going to compare what you're hearing from me with what you've already stored. Some of it you're going to throw out and some of it you're going to say, "That's kind of interesting." Some of it you're going to use to illustrate a shift around a few things you've already stored, and you're going to come out of here with the tinniest little bit of change in the cognitive part

of your brain. That's very different from what would happen if this was a traumatic experience.

In a traumatic experience, what happens is this: You could be sitting in this lecture, hearing my words and seeing my image. If this was a video, for example, and your brain, when you're in a state of relative calm would be focusing on that, the only part of the brain that would be getting novel signals would be up here. Then somebody would come in and shoot a gun in the air and all of a sudden the entire baseline of all of these experiences would shift. You'd start to have affective and maybe even motor vestibular and certainly state memories. Pretty soon your brain would make an association between Dr. Perry, a life-threatening situation and sitting in a certain motor position, because he said, "The next person that moves is going to die," and this is a high state of arousal. There will be a chain of memory created that later on in life when you hear a Dr. Perry lecture, you'll actually tap into this chain of stuff. You'll feel distressed, you actually may have changes in your heart rate. You could also have a very different kind of response, which you could actually do something to activate your heart rate, like exercise, and all of a sudden find yourself thinking about a Dr. Perry lecture and being traumatized.

Once you make a chain of memory, traumatic memory, because it's all a novel set of neuronal signals that take place in context of a life-threatening situation, your brain will store a traumatic experience at multiple levels of the central nervous system. Make sense? Okay. When I get to talking about some of this stuff, I don't know whether we'll get to it this morning or this afternoon, but we'll talk a little bit about how to break some of those links between different levels of traumatic memory.

Let's assume the brain is organized a little bit. You've got a child who is a couple years old, and from that point on the brain is pretty well organized. The child is still going through many important developmental things and lots of changes will take place. However, let's say you have this child in your therapeutic classroom and you know they've been neglected and you want to do something to help them change. When you interact with that child, what you're trying to do is change their brain. The problem is, not all parts of the brain are equally malleable. As I said before, "Therapy is changing the brain. Development is changing the brain." Developmental opportunities and education is changing the brain. All of these things are trying to shift this homeostasis and trying to influence how these systems work. The problem we have with trauma is the following: both neglect and trauma result in abnormalities down here. These are really hard parts of the brain to change. The cortex is an easier part of the brain to modify than the brainstem. Now this makes a lot of sense from a species survival perspective.

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…the brain and the systems that regulate heart rate and blood pressure and body temperature, you pretty much want to leave that alone. You do not want those systems to be easily modified because those are core regulatory functions. On the other hand, up in the cortex where you're making associations between cognitive things where you

are really seeking a higher order level of learning, you need to be able to learn after a single trial. The example I always use is sort of goofy but I think it makes the point. If you're sitting around a campfire with your pal, Og, and you hear a growl out in the dark, and all of a sudden this big animal with large teeth jumps out and grabs Og and drags him into the darkness, it's really important that your brain makes the association between that sound and danger after one trial. I mean it's not like you can afford five or six opportunities to learn that. You need to make that association just like that, and that's why this part of the brain changes very easily. The problem that we have, of course, doing therapeutic work is that these parts of the brain, relatively harder to change, are the origins of many of the trauma-related symptoms.

The other thing that's very, very difficult about our current therapeutic approaches, although many of you are beginning to use approaches that are not completely bound by this, is that most of our therapeutic approaches only address and provide experiences to influence these parts of the brain. They're relational based and they use words. We don't use movement and we don't use anything to influence the brain stem. Now ENDR is different. For example, dancing, drumming, some of the more somatic therapies are different. I think that's why they work with traumatized people. I'll talk about some of that later on.

One thing that gets us in trouble with how the brain works and in trauma is that the brain has the ability to create memory at all levels. One thing that most of you don't appreciate probably, unless you're a neuroscientist, is that all incoming information from the external world stops down here first before it gets up to the cortex. Imagine you're in Vietnam, people are shooting at you and you hear loud sounds. The sound, the neural pattern associated with an explosion causes a certain set of activity here, and your brain is associating that with a life-threatening situation. It chooses to act. It activates the stress response system and your stress response goes off. You actually, in response to that association, make an action even before your brain gets up here to tell you what's going on. 20 years later, you can be walking down the street and there will be a car backfire, and that noise will come in, that pattern of neural activity will trigger a whole chain of activity, and access that traumatic memory chain. You'll be thinking about Vietnam, have a sense of disphoria and you'll have a startled response even before the information gets to your brain to tell you, "Hey it's 20 years later and that was a car backfire."

On one hand, this is part of the wisdom of the brain to keep us alive. It's part of the very conservative nature of the brain. See the brain is very conservative. It wants to keep us alive more than anything. That means it's going to interpret all of this stuff as potentially threatening. If anything, it's going to err on the side of being conservative and being overly reactive than being underreactive. This pre-cortical association is a huge problem in trauma. The reason it is, is that during the rape, a young girl, being raped in a garage, her brain is going to make associations between the rape, the smell of motor oil and all kinds of other neutral cues. Later on when she's walking down the street and a car that's got a motor oil problem drives by, her brain is going to cause her to feel this distress, and she's not going to know what's going on.

Let me give you some interesting examples from our clinical work of how this precortical association is played out. My first real introduction to this was when I was working in the V.A. system, and I had just finished coming off of six months in the ICU, where you sort of do real doctor stuff, then you start your psychiatry residency, they give you a list of patients and appointment times, and they say, “Well good luck,” and “We’ll see you,” and “Call your supervisors and set up some meetings with them.” Meanwhile, you think, well, “What am I supposed to do?” Well you go meet with these people. I didn’t know what to do. One of the first patients I got was this gentleman who had spent two years in Vietnam, a very nice man, and he had been in lots of combat. He didn’t feel guilty about it at all. He’d felt like he’d done the service to the country. He came back home, married his high school sweetheart, had kids, worked as a local foreman at a factory in a small town in Connecticut and was doing great. One night about 4:00 a.m. he woke up in the middle of the night in a cold sweat and couldn’t really get thoughts of Vietnam out of his head. It was really intrusive and disturbing. The next night the same thing happened. The next night the same thing happened. Pretty soon he was drinking to extinguish these feelings of distress. Finally it got so bad that he actually came to the V.A. This is at a time when PTSD was not widely accepted by the V.A. system, and it was really a big step for someone to come and do that.

Of course, in all of our respect and admiration for these people sacrificing for their country, we make sure that they get the finest care and assign them to a first-year resident. He was assigned to me, I went in and sat in the room with him and he stared at me and I stared at him. I didn’t know what I was supposed to do, and he didn’t know what was supposed to happen. We ended up talking about sports. We formed a relationship, but it had very few, at that point, therapeutic elements to it. I didn’t know what the hell I was doing. Of course, he got worse. He ended up being in the hospital and we tried a lot of different things. Nothing worked. Nothing made him better. We continued to have this relationship where he was generally pretty kind to me, but at one point he said, “You really should go into a different business.” And he said, “I hope you’re better with your rats than you are with me.” It was terrible. I sort of felt bad, because he wasn’t getting any better. One day I’m reading the paper at breakfast and I notice this article from his small town. The byline was from this small town in Connecticut, and I thought, “This is interesting.” It was about Secorski(?) helicopters. So sure enough I called up Secorski(?) and they had a factory. To the day that he remembers waking up, they started flying over his house at 4:00 a.m. when they’re testing helicopters, the new helicopters. I told him to move. He did, and he got better.

I say that because that’s a very interesting thing for several reasons. The first one is that sometimes people are so inundated by reminders of a traumatic event that no matter what you do therapeutically, you’ve got to get them out of it. They’re just drowning in evocative cues. This is particularly the case when the information is precortical, when the information is something that comes in and you can’t consciously avoid it. It’s very difficult for these people, and you have to make structural interventions. You have to get them out of whatever the mess is that’s causing the problem.

There's another situation I worked with where there was a child who had been served into prostitution by his father. His father took him to truck stops and truckers would force the little boy to falate them while he was sitting on his dad's lap. He was finally removed from this family and put into the care of a foster family who was making about $280,000 a year, despite the fact that neither one of them had any kind of education. They were making $280,000 a year taking care of high-risk CPS kids. They had 12 kids in their custody. The only way that they could take care of these children was to contain them, by using very, very strict behavioral techniques.

One of these techniques was to have the children run up and down stairs. They made this boy run up and down stairs, and finally one day he said, "I don't want to do this." He's at the top of the stairs, and the foster father pushed him and he fell down the stairs and he ended up with a coma. This part of his brain, the cortex was basically gone, nonresponsive. I went to see him in the nursing home that he was in. He was hooked up to a heart rate monitor and we put a t-shirt from the father under his nose and his heart rate went from 100 up to 160, just like that. He would thrash around. No other t-shirt would cause it and we did the same thing with the father's voice. Audio recordings of multiple males, no change, his father's voice, his heart rate went up significantly. These kinds of precortical associations play a major role in some of the seemingly unpredictable behaviors and out of control things that we see in high-risk kids. I have a lot of examples of that clinically, but I don't want to go on and on about that too much.

I do want to talk very briefly about this. I'll come back and talk a little bit more about memory and some therapeutic stuff later this afternoon. I want to talk first about what the brain really do when it does activate a stress response, what are some of the systems involved, how does it work, what are the consequences of activation in the stress response, and how does that influence out work both under therapeutic situations but also in normal situations in development?

First thing again, I'm reminding you that the brain doesn't like surprises. This is clinically a very important thing. So many times we will put children in a new situation and then we will do an interview with them as if they are somehow in that circumstance going to be able to give us more useful information than if we put them in a more continuous, long set of interactions. There's been a huge mistake that's been made in the field of particularly interviewing kids that have been sexually abused, where they have made the mistake of thinking that you can somehow get good information from children using this children's assessment center model. I know they're well intended and there are some great clinicians and good programs, but the reality is they would be much, much more efficient, and they'd get much, much better data if they knew more about how the brain worked. I'll talk about some of those things hopefully later on.

The first thing I want to say is, and I don't think I have this slide in here, but what I want you to do is not be afraid of stress. Stress is actually a really, really important thing. In fact stress is absolutely necessary for normal development. If you look at what makes children resilient, what you find in fact is that they've had opportunities for moderate, controllable stress. And that's helped them. You know how the brain develops in a use-

dependent way? Right? Any part of the brain that you activate in practice, that part of the brain is going to be organized. So if you have somebody who practices a piano, again and again and again and again, they're going to develop the motor vestibular capability to play piano. If you have somebody who practices again and again and again moderate activation of the stress response, they're going to have the neural apparatus to actually respond to a stressful experience later in life. You build this in as a function of typical healthy (inaudible) and exploration as a young child.

Remember what I said about how novel information activates the stress response a little bit? What happens is, here's the caregiver right here, safe and stable. This is your home base. You feel secure here. What you do is you start to venture away. Now you can ambulate. You, kind of, look back. You're a little further away, your stress response is a little bit activated, you see something new from a new perspective, it's novel information and your stress response gets a little bit higher. You look back at mom and you feel safe and comfortable. Then you're doing something and mom putters off to a different room. Then you look back and you go, "Oh." Your stress response gets high and you go find your mom and you hold mom's…you get a little bit of secure reassurance. Of course, mom thinks, "Oh you're coming to give me a hug." Mom holds a little bit too long and baby's going, "Come on, come on, I'm going. I'm going to look." They do this again and again and again. What they're doing is practicing weightlifting for their stress response system. It's building in this capacity to tolerate a little bit of distress, to tolerate a little bit of discomfort, and over time they develop this capacity to be in new situations and cope in a functional way. They have a healthy, flexible stress response neural biology.

Now one of the very sad things that happens is, particularly in a lot of our modern parents, they're afraid to let their children be distressed, dirty or in any position of harm. So what happens is when the child starts to go explore and climb a little bit, "Oh don't do it, don't climb." "Don't do dirty things." "Oh don't get dirty. Don't do this." What will happen is when the child starts to go, the parent goes right after them, so there's never any opportunity to actually have these little moments of discomfort, little moments of stress, and then when they get to be chronologically age five, what do we do? Oh we decide that now it's time for you to go to preschool. They leave this child in a completely new environment with new people and they don't have the internal apparatus to deal with it. They develop school fear and they hate going to school and they cry for hours. They're school phobic. We've seen many, many, many parent anxiety induced anxiety disorders in children.

Stress is something that you shouldn't be afraid of. However, many of the children that we work with are in situations where their stress response systems are activated in extreme ways or in unpredictable patterns, and are maintained at that high level of activity for excessive periods of time. Children in domestic violence settings, for example, and children who are in community violent settings. Children who are in any host of sort of chaotic, disorganized, dysfunctional caregiving environments end up having this poorly regulated stress response system, because they have had this

external pattern of activation that's chaotic, that's dissynchronous, and they end up with a poorly regulated and very often a sensitized stress response neurobiology.

Now under normal circumstances of threat, your brain has a number of different things it can do. I think probably the most over-studied of these systems, of course, is this classic fight or flight response. We use our (inaudible), it involves the amygdule, it's sort of the classic thing that you read about with Vietnam vets, and blah, blah, blah. The fact is that for young children they cannot effectively fight nor can they effectively flee. And there are times when adults cannot do that either. So it is very adaptive for our brain to have another way to cope with threat under those circumstances. We use a whole different neurobiological adaptational style we call dissociation. It involves a number of adaptive responses that are different from the adaptive responses to the hyperarousal response.

Hyperarousal means that you're going to increase your heart rate. You're going to mobilize blood to your periphery. Your heart rate is going to be like 120, you're going to be basically preparing to fight and flee. Well, if you are in an inescapably threatening situation and there's a probability that you'll get physically injured, and you get cut in your arm and your heart rate is 120 and you're pumping your blood to your periphery, you're going to bleed to death. If you're in an inescapable situation, the most adaptive thing to do is to decrease your heart rate and to decrease peripheral blood flow. You activate the systems that do that. Which means that if you get cut in the periphery, you actually have a much higher probability of surviving.

If you are dissociating and you freeze and you are compliant and you are like an opossum as opposed to another animal, you actually have a lower probability of being identified by a predator or being attacked by a predator that knows you're there. The major predator of human beings—and I'm going to talk about this after lunch—the major predators of human beings, throughout our entire history have been other human beings. Our history is characterized by clan tribalism, raiding one clan, raiding another one. During those raids, what we do is we fight and kill the males or drive them off, and we would incorporate the females and the young children into our clan. If the females or the young children resisted and fought us, we'd kill them. Their genes would not be passed on. If they were in compliance and did what we told them to do…..Which one of these women are you going to take to your camp, the one who's fighting and scratching and screaming and kicking, or the one who is robotically coming along with you and compliant? You'll kill this one and you'll take this one along, which means her genes will get passed on and her genes won't. If you have a 5 percent higher probability of survival in any adaptive choice, it takes 100 generations for that trait to be selected out. So we've had more than 100 generations to select out dissociation as a highly adaptive trait that's more common in females than in males. There's a whole lot of stuff we can go on about that. It's biology. Biology's good. What I want you to appreciate here with this is that the same event can have different impact, depending upon pre-loaded(?) factors of the child and post-event factors.

If you go to our Web site, there's a bunch of different charts that you can look at that can sort of list all these different things, but I wanted to give you this as an example of the relationship between use-dependent changes in the brain and trauma. Any factor that will increase the length of time you stay in a high alarm state following a traumatic event will increase the probability that you'll get PTSD-like symptoms. Any factor that decreases the amount of time you spend in that state, will decrease the probability that you'll get PTSD. So let me give an example from our work with some of the children following 9/11

We got to know some kids that were at a school right down in Soho. Here they were in their classroom, and in rushes the teacher and says, "Go to the window." They went to the window and watched the World Trade Center collapse. Pretty soon their classroom was covered in dust. This child, both parents had come from an attacked family. Both parents showed up at the school, picked him up, and a year later he's right here. He's not perfect, but he doesn't have significant trauma-related symptoms. This is a child whose parents just went through a conflictual divorce. One parent worked in the World Trade Center and he was picked up fortunately by that parent. That parent did not get injured or die in the World Trade Center. But a year later this person is still in a significant state of alarm. This is a child whose mother worked in the World Trade Center, never knew his father, lived away from extended family, and the mother died in the World Trade Center. He's still a mess a year-and-a-half later. So pre-morbid vulnerability, post-morbid, post-event, attenuating factors make a huge difference in how long you spend in this high arousal state.

This is an example from our work with the Branch Dividian children. We worked with the 21 children that were released from that compound after that original ATF assault. We spent weeks and weeks and weeks with these children. They all lived in sort of this cottage-like setting where we brought our staff in and simply lived with them. Five days after the original assault, despite the fact that these kids were eating and sleeping and drinking and doing all kinds of things, the mean resting heart rate for this group was 134, which is very, very high. This is 100 and the mean for this group should have been way down here, about 85. And you can see for weeks and weeks and weeks and weeks they stayed in a high arousal state, and to this day at least half of them have PTSD symptoms.

When you are exposed to an environment where there's this kind of either extreme or permeating threat, what happens is your brain changes the physiology associated with normal stress reactivity. Let me walk you through this, because I think it's helpful to some degree. This axis right here is the level of threat. These are labels for different internal states. What I think you can appreciate is that the neurobiological systems that are going to be activated in a state of terror will be very different form the neurobiological systems that are activated when you are calm. You wake up in the morning and you are relatively calm. You go to work and you get into sort of a low level vigilance state and you get a job review and, because of the way the brain is organized, you pay much more attention to negative information than positive information. Even though the job review says on your annual review your supervisor says you've done a

great job on A, B, C, D and E, we have a little problem with F. As soon as you hear we have a little problem with F, you get more anxious and then you don't even hear what they're saying accurately. You don't process the information very well. Then you go out afterwards and you compare notes with your peers, and you find out that they got the same information, and you mutually agree that your boss is a jerk, and you feel better. Then you go tell somebody else and they agree that your boss is a jerk, and you feel better. You go home and you have a beer, and you feel better. You sleep on it and you wake up the next day and you're ready to go again.

The point is that there's a linear relationship between external threat and your internal state of arousal. The children that come from these traumatizing backgrounds, however, have changed their baseline so that they wake up in the morning and they're already in a state of alarm. For any minor challenge, a new child in the foster care setting, a test, a piano recital, they have this dramatic overreaction that is disproportionate to the actual level of threat. This hyper-reactivity and this abnormal response system leads to significant problems in the way these kids function. This hyper-reactivity can take place if you use a predominant hyperarousal response or if you use a predominant dissociative response. So, your hypersensitivity can manifest either as you're tuning out under any minor circumstance—that would be a dissociative—or to your being inattentive, hypervigilant and externalizing any behavioral symptoms. That would be a hyperarousal response. The key is that whether you use a primary dissociative or primary hyperarousal response during the traumatic event, you can still end up with a sensitized set of reactions.

So many of you, I'm sure, are used to working with little kids who come from an inescapably threatening environment where they've been forced to dissociate a lot. When they're interacting with you or you observe them in a certain setting, and there's a tiny little challenge, they'll just tune you out. They'll act like they don't hear you. They're sort of not there for a little while. That's a dissociative response. Whereas other kids, as soon as they're given a little bit of a challenge, they'll stand up, they'll walk around the room, they'll start to throw things, they'll poke at you, they'll be externalizing. Both of these are manifestations of the same neurophysiological response on a molecular level, but they use different systems. If you think about the way an opossum responds when under threat, that's sort of what a dissociative response is. They freeze and play dead, they're non-reactive to actually painful input.

Some children who come into a pediatric setting, for example, who have come from one of these environments, when you draw blood on them, they're just robotically put their arms forward. It sort of freaks out the staff because they're used to kids kind of being squeamish and getting crazy. These kids will just robotically do that. That's because they have is opioid, dissociative phenomenon. Now a lot of these kids as they get older, do you know what they find? They find out that they can actually self induce an opioid hit by biting or by head banging or by cutting. All of those actions actually cause a little burst of dissociation. I don't have a sensitized dissociative response. When I cut myself, it hurts. It doesn't cause this more global response of opioids. But, if you have a

sensitized opioid system, and you cut yourself, you get this more pervasive response, and it feels soothing and calm, ironically enough. So that's dissociation.

As you get older, of course, you are more capable of fighting or fleeing. The mixture of these two responses shifts with age. Let me give an example of the child who uses a predominant hyperarousal response. I think speaks to the issue I brought up earlier about the difficulty we have with some of our structured interviewing models with sexual abuse kids. This is a child that we've worked with. I know him very, very well. I work with him in his foster placement, where he feels safe. He's known me for years. He has, over the course of our work, spontaneously shared very detailed specific about his traumatic events with us, so we know what happened. We have independent corroborative information that that's accurate, including physical evidence on him and confessions from the people that did it. Here he is at baseline in a free play situation with me, a continuous heart rate. Here we go, here's his heart rate. We're just hanging out, playing cards, doing nothing. His resting heart rate averages out at about 104. Higher than what you'd expect for a typical kid this age. And at this point I actually started a semi-structured interview for PTSD. Now it's the same kind of an interview used for research purposes, it's an interview that's used sometimes for forensic purposes.

I started the interview here and it starts out by saying, "What's the worst thing that ever happened to you?" If they don't mention the traumatic event, you sort of ask them, "What about this event?" Then you ask questions about symptoms. Here's what he did. His heart rate immediately went up, and he sort of had this seesaw responsivity that involved some element of tuning out, some element of being present, some element of tuning out, some element of being present. The whole time, rather than giving me factual and accurate and complete responses, he gave me evasive, protective and sometimes inaccurate responses that you could call lies.

Now why did he do that, and why is this clinically important? This is clinically important because from our experience, and I think probably from your own experience as well, when you surprise somebody and you force them to talk about an emotionally charged event, when they don't want to, they will use words to conceal and protect more than they will to reveal. Even though this child knows me and trusts me as much as he trusts anybody in this world, he didn't want to talk about it then. So, he minimized his symptoms. If you didn't know any better, you would have thought geez hardly anything happened with this kid. This is, of course, a very sobering thing when you think about the accuracy of some of our interviewing for forensic purposes and for research purposes. This is a child who had a very different response. Let me go back and remind you that this child's response during the traumatic event was hyperarousal response. So, because he activated that response in a continuous, persistent fashion, he developed hyperarousal symptoms as part of his post-traumatic complex.

This child, on the other hand, used predominantly dissociative responses. She's a five-year-old girl who came from a sort of a family where there was domestic violence. She was sitting on a couch with her mother and her father came in and shot the mother in the head and killed her, and then put the gun in his own mouth and blew his brains out.

She was found wandering on the street about two hours later covered in their blood and brains. We started working with this child the next day. Five weeks after that event, her resting heart rate was 128, so she was part way up this arousal continuum. Here she is at a free play session with me and we're just playing and hanging out, talking about stuff. She got up and moved here, and then she came back and sat down. There's some movement artifact. The bottom line is it comes up to about 126. Right here I started this semi-structured interview. I said, "What's the worst thing that ever happened to you?" And what she did was she had then animated in her play. We'd been coloring and doing stuff, and she was animated and all of a sudden it's just like I pulled the plug out of her. She stopped, and she turned her head down and to the left. She gazed off into space and didn't blink. It was as if she was watching something run through her head. Then she looked back at me and robotically said, "This weekend I wanted to have a sleepover, but I didn't clean my room so my auntie said no." I said, "That's the worst thing that ever happened to you?" "Yes." "What about the thing that happened between your mom and dad?" "Oh, that was bad too." For the whole rest of the interview you can see her heart rate, instead of going up, it went down. She got to the point down here where she almost fainted. It went on and on and on and again the responses were evasive, protective. You wouldn't even have known that that happened.

Now remember that little three-year-old boy that saw his sister get murdered? This is a tracing from that interview with this child. I was asked by law enforcement to interview the child because it's what I do sometimes. Here's a sample of the free play tracing right here. Resting heart rate is about 108. I didn't talk here, aside from telling him who I was, why I was here, what I wanted to talk about, that's it, telling him that he didn't have to say anything, and that we'd just hang out. This is when I first started talking. Just the mere act of talking and—I wasn't even asking questions—led to him moving further along the arousal continuum, which is a very important thing. Think about it. Here's a kid about this high. I'm 6'2". It would be like me going in an office with somebody who would be 18 feet tall. No matter how child friendly you were trying to be, if I went into a doctor's office who is 18 feet tall, and as they pulled that glove on, I would be thinking this could be bad. Right? You're in a position where you are highly vulnerable. So we think that we're asking these child-friendly questions like, "What do you like on your pizza?" and "What do you like to watch on TV?" They're like going, "Cheese." Like why are you asking me this?

So many of our attempts to be child friendly are so transparent. Anyway, so just the mere act of interacting with these kids makes them a little bit more anxious.] I'll talk about some clinical things we can do to reduce that later on. Right here I just sort of mentioned the name of one of the potential suspects. Now this is a movement artifact. He got up and walked around. I mentioned that name and that other person again right here. Here I mentioned the name of the person who ended up being the woman who confessed. His heart rate went up, and he did that same thing, robotically. His heart rate went up and then he froze. I didn't talk at all here. I just let him sort of unwind. It was weird. It was like he froze and then after about five minutes he just slowly melted and became a little bit more animated and engaging. I mentioned that person's name one

more time, and what happened was his heart rate went up and then he just sort of rolled over and sort of like collapsed on the floor, like somebody let the air out of him.

After that interview, I went out into the waiting room where this person was, and I said, "You know, you really need to think about what you want to say to the police, because this was a very, very revealing interview. And I think that you'd probably be better off if you had a chance to tell your story." She confessed. It was a very interesting use of state memory. He stored that information, but he didn't have to tell me any words for me to get some sense of what happened or who did it actually. The more you are in a state of dissociation, the more likely you are to carry forward dissociative-like symptoms. The more you are in a state of high arousal and have this fight or flight response, the more you are likely to carry forward symptoms associated with changes in those parts of the brain.

We know about the primary responses that people develop after this hyperarousal, right? These kids end up looking like they have ADHD, they're impulsive, they're aggressive, they have sleep problems, they'll go to sleep, and they have a hard time settling down and going to sleep. Very often after about three hours they'll wake up and be wide awake and wander around the house. All kinds of these things are pathopneumonic of having a locussurilious(?) that is overactive and poorly regulated. Now the group that hasn't been described as well by other researchers and hasn't been written about in the literature very much are people who have primary dissociative responses, which are the kids who instead of walking down the street like the Vietnam vet and you hear the car backfire and your heart rate goes up, they're the kids who are walking down the street and they smell the after shave of the paramour who used to rape them, and their heart rate goes down and they faint. One of the primary ways that these kids present are with these somatic complaints. They have gut problems, they have sort of nonspecific headaches, they have (inaudible) origin, they have what looks like poor Absont(?) seizures. A lot of these kids in the foster care system end up being diagnosed with Absont seizures. They don't really have those, but they have what looks exactly like that. So, the clinician says it's close enough and we've got sort of this nondescript changes on the EEG. Just to be safe, I'm going to go ahead and prescribe an anti-convulsive medication. I could go on and on.

Thank you.